

**Claims:**

- 1           1.       A method of creating a patterned monolayer on a substrate,  
2 comprising;  
3           preparing organic molecules having self-assembling properties;  
4           applying the organic molecules to an aligning surface; and  
5           separating the aligning surface from the substrate, leaving ordered patterns of  
6 the organic molecules on the substrate.
- 1           2.       A method according to Claim 1, wherein the aligning surface  
2 comprises a graphite-like substrate.
- 1           3.       A method according to Claim 1, wherein preparing includes preparing  
2 at least two different species of organic molecules to preferentially align to a specific  
3 feature on the aligning surface when applied.
- 1           4.       A method according to Claim 1, wherein preparing includes preparing  
2 at least two different species of the organic molecules to preferentially align to a  
3 plurality of features on the aligning surface when applied.
- 1           5.       A method according to Claim 1, further comprising utilizing the  
2 ordered patterns as a mask.
- 1           6.       A method according to Claim 1, further comprising contacting the  
2 aligning surface with the substrate.
- 1           7.       A method according to Claim 1, wherein the aligning surface is highly  
2 ordered pyrolytic graphite.
- 1           8.       A method according to Claim 1, wherein each of the organic molecules  
2 have a tail group and a head group, and optionally a functional group.
- 1           9.       A method according to Claim 8, wherein the head group is a molecular  
2 group.

1           10.     A method according to Claim 9, wherein the head group is a molecular  
2     group having an aromatic ring.

1           11.     A method according to Claim 8, wherein the head group is biphenyl.

1           12.     A method according to Claim 8, wherein the ordered patterns include  
2     substantially parallel lines, and wherein the size of the tail group helps determine  
3     lateral spacing between the parallel lines.

1           13.     A method according to Claim 12, wherein preparing the molecules  
2     comprises preparing a solvent system having organic molecules therein, and wherein  
3     the organic molecules used to prepare the solvent system determines the lateral  
4     spacing.

1           14.     A method according to Claim 8, wherein the functional group of the  
2     organic molecules is chosen based on processing requirements.

1           15.     A method according to Claim 14, wherein the organic molecules each  
2     contain a biphenyl subgroup.

1           16.     A method according to Claim 14, wherein the organic molecules each  
2     contain a thiol group and wherein the substrate contains a layer of gold.

1           17.     A method according to Claim 14, wherein the organic molecules  
2     contains an isocyanate group as the functional group, and the substrate contains a layer  
3     chosen from one of platinum and palladium.

1           18.     A method according to Claim 14, wherein the organic molecules may  
2     contain an isocyanate group as the functional group, and particles containing palladium  
3     preferentially align to the surface along aligned molecules according to their  
4     functional groups, and wherein the substrate surface includes palladium.

1           19.     A method according to Claim 14, wherein the self assembled organic  
2 molecule contains an isocyanate group as the functional group, and particles containing  
3 platinum preferentially align to the surface along the ordered isocyanate functional  
4 groups.

1           20.     A method according to Claim 1, wherein each of the organic molecules  
2 have a tail group and a head group, and optionally a functional group, wherein the  
3 organic molecules are laterally spaced after they are applied.

1           21.     A method according to Claim 20, further comprising solvating the  
2 organic molecules in an alkane solvent, wherein the solvating process controls the  
3 lateral spacing of the organic molecules.

1           22.     A method according to Claim 20, wherein the organic molecules each  
2 comprise substituted alkyl biphenyl.

1           23.     A method of creating a patterned feature on a substrate comprising:  
2 preparing a solution of organic molecules having self-assembling properties;  
3 applying the solution to an aligning surface;  
4 contacting the aligning surface with the substrate; and  
5 separating the aligning surface from the substrate, leaving patterns of the  
6 organic molecules on the substrate.

1           24.     A method according to Claim 23,  
2 wherein separating the aligning surface from the substrate includes leaving  
3 ordered patterns of the organic molecules on the substrate in a manner to perform as a  
4 mask.

1           25.     A method according to Claim 23 further comprising introducing  
2 additional organic molecule species to the surface which preferentially align to the  
3 functional groups existing along defined patterns.

1           26.     A method according to Claim 23, further comprising introducing  
2 additional organic molecule species having functional groups to the surface to cause  
3 certain molecules to preferentially align according to functional groups along pre-  
4 defined patterns.

1           27.     A method according to Claim 24, wherein the method further  
2 comprises etching the substrate.

1           28.     A method according to Claim 25, wherein the method further  
2 comprises etching the substrate.

1           29.     A method according to Claim 23, further comprising controlling the  
2 lateral spacing of organic molecules by solvating the self-assembling molecules in an  
3 alkane solvent.

1           30.     A component for use in a device comprising: ✓  
2 a substrate; and  
3 a self-assembled monolayer that adheres to the substrate and that is prepared  
4 using organic molecules that align themselves in an ordered pattern configured with a  
5 solvating process that promotes an ordered alignment of the molecules on an  
6 alignment surface.

1           31.     A component according to Claim 30, wherein the device is a  
2 computing device.

1           32.     A component according to Claim 30, wherein the self-assembled  
2 monolayer is composed of a plurality of organic molecules, each having an alkyl  
3 chain, a head group that adheres to the substrate and an optional functional group that  
4 has beneficial properties.

1           33.     A component according to Claim 30, wherein the self-assembled  
2 monolayer is a dielectric material.

1           34.     A component according to Claim 30, wherein the self-assembled  
2 monolayer includes aligned Au nanoparticles.

1           35.     A component according to Claim 30, wherein the self-assembled  
2 monolayer is an etch mask for creating features on a substrate.

1           36.     A component according to Claim 30, wherein the self-assembled  
2 monolayer provides an etch mask for making nanosized wires.

1           37.     A component according to Claim 30, wherein the self-assembled  
2 monolayer is configured in a parallel line pattern, where lateral spacing between the  
3 lines is controlled by solvating organic molecules in an alkane solvent.

1           38.     A component according to Claim 37, wherein each organic molecule is  
2 a substituted alkyl biphenyl.

1           39.     A component comprising:     /  
2           a substrate having a substrate surface; and  
3           nanoscale ordered patterns of organic molecules located on the substrate  
4 surface, the nanoscale ordered patterns being formed by organic molecules having a  
5 tendency to naturally align in an ordered pattern when temporarily applied to an  
6 aligning surface and subsequently transferred to the substrate surface.

1           40.     A component according to Claim 39, wherein nanoscale ordered  
2 patterns of the organic molecules are used as components in a circuit on the surface of  
3 the substrate.

1           41.     A component according to Claim 39, wherein nanoscale ordered  
2 patterns of the organic molecules are used as a mask for etching components in a  
3 circuit on the surface of the substrate.

1           42.     A component according to Claim 39, wherein the nanoscale ordered  
2 patterns of organic molecules are created from a dielectric material.

1           43.     A component according to Claim 39, further comprising nanometer  
2     sized features on the substrate surface created by etching the surface around the  
3     nanoscale ordered patterns of organic molecules.

1           44.     A component according to Claim 39, wherein the aligning surface has  
2     graphite-like properties.

1           45.     A component according to Claim 39, wherein the organic molecules  
2     contain alkyl chains that extend away from the substrate surface and that are  
3     connected to the substrate surface by a functional group.

1           46.     A component according to Claim 39, wherein the lateral spacing of the  
2     ordered patterns is controlled by solvating alkyl-cyano biphenyl molecules in an  
3     alkane solvent.

1           47.     A component comprising:     /  
2     a substrate having a substrate surface; and  
3     a self-assembled layer having nanoscale ordered patterns of molecules  
4     produced by a means for aligning self-assembling molecules in ordered patterns and a  
5     means for transferring the self-assembled monolayer to the substrate surface, where  
6     the self-assembled layer accommodates nano-scale circuit components.

1           48.     A component according to Claim 47, wherein the nanoscale ordered  
2     patterns of molecules are used as components in a circuit on the substrate surface.

1           49.     A component according to Claim 47, wherein the nanoscale ordered  
2     patterns of molecules are used as a mask for etching components in a circuit on the  
3     surface of the substrate.

1           50.     A component according to Claim 47, wherein the nanoscale ordered  
2     patterns of molecules are created from a dielectric material.

1           51.     A component according to Claim 47, further comprising nanometer  
2 sized features on the substrate surface created by etching the surface around the  
3 nanoscale ordered patterns of molecules.

1           52.     A component according to Claim 47, wherein the means for aligning  
2 includes a surface having graphite-like properties.

1           53.     A component according to Claim 47, wherein the nanoscale ordered  
2 patterns of molecules contain alkyl chains that extend away from the substrate surface  
3 and are connected to the substrate surface by a functional group.

1           54.     A component according to Claim 47, wherein the nanoscale ordered  
2 patterns of molecules are laterally spaced and are controlled by solvating alkyl-cyano  
3 biphenyl molecules in an alkane solvent.